



PATENT APPLICATION  
PO-7955  
HE-178

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICATION OF	)	
MARTIN SCHAMBERG ET AL	)	GROUP NO.: 1711
SERIAL NUMBER: 10/800,908	)	
FILED: MARCH 15, 2004	)	EXAMINER: JOHN M. COONEY
TITLE: PROCESS FOR THE PRODUCTION	)	
OF POLYURETHANE FOAMS	)	

**LETTER**

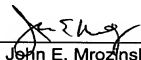
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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 2231-1450

Sir:

Enclosed herewith is a copy of an Appeal Brief in the matter of the subject  
Appeal. Please charge the fee for filing the Brief, \$500.00, to our Deposit Account  
Number 13-3848 .

Respectfully submitted

By

  
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John E. Mrozinski, Jr. Reg. No. 46,179

Name of applicant, assignee or Registered Representative

  
Signature

August 29, 2007

Date



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**APPEAL BRIEF**

Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Brief is an Appeal from the Final Action of the Examiner dated March 29, 2007 in which the rejections of Claims 17-35 were maintained.

I. **REAL PARTY IN INTEREST**

Each of the inventors has assigned his interest in the present application to Hennecke GmbH, a German corporation. Hennecke GmbH is therefore the real party in interest in this Appeal.

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John E. Mrozinski, Jr. Reg. No. 46,179

Name of applicant, assignee or Registered Representative

Signature

August 29, 2007

Date

## II. RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings which are related to, affected by or have a bearing on the Board's Decision in this Appeal.

## III. STATUS OF CLAIMS

Claims 17-35 stand rejected and are the subject of this Appeal.

No claims have been cancelled.

Claims 1-16 have been withdrawn from consideration.

No claims have been objected to.

No claims have been allowed.

## IV. STATUS OF AMENDMENTS

In response to the Final Action of the Examiner, Appellants filed an Amendment simultaneously with their Notice of Appeal. In this Amendment, Claim 17 was amended in accordance with the Examiner's suggestion at lines 9-10 of that claim to replace the term "the filler" with "any filler". To date, Appellants have received no indication that this amendment has been entered.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to an apparatus for the continuous production of polyurethane foam. (page 10, lines 23-24 of the specification) This apparatus includes: (1) at least one storage vessel for each of the isocyanate component (page 11, lines 3-4; element labeled **4** (Figure 1), **37** (Figure 2) and **68** (Figure 3)), polyol component (page 11, line 2; elements labeled **1** and **2** (Figure 1), **34** and **35** (Figure 2) and **65** and **66** (Figure 3)), liquid carbon dioxide (page 3, line 18; page 11, lines 2-3; elements labeled **3** (Figure 1), **36** (Figure 2) and **67** (Figure 3)) and any additive (page 11, lines 11-12 of the specification); (2) a feeding device for each of the isocyanate component (page 11, lines 4-6 of the specification; elements labeled **8** (Figure 1), **41** (Figure 2) and **72** (Figure 3)), polyol component

(page 11, lines 4-6 of the specification; elements labeled **5** and **6** (Figure 1), **38** and **39** (Figure 2) and **69** and **70** (Figure 3)), any additive (page 11, lines 11-12 of the specification) and liquid carbon dioxide (page 11, line 8 of the specification; elements labeled **7** (Figure 1), **40** (Figure 2), and **71** (Figure 3)); (3) a main mixer for mixing the isocyanate component and the polyol component (page 11, line 9; elements labeled **23** (Figure 1), **55** (Figure 2) and **84** (Figure 3)); (4) a pipe between each of the storage vessels and the main mixer (page 11, lines 6-9 of the specification; elements labeled **29**, **61** and **90** (isocyanate), **26**, **27**, **59**, **60**, **88**, **89** (polyol) and **28**, **60** and **89** (blowing agent)); (5) at least one container for receiving or storing filler (page 11, lines 14-15 of the specification; elements labeled **11**, **44** and **74**); (6) an apparatus for the admixture of filler into the isocyanate component or the polyol component (page 13, lines 1-12 of the specification); and (7) an apparatus for comminution of agglomerates in any filler (page 11, lines 19-22 of the specification; elements labeled **12**, **46** and **77**). This apparatus also includes: (a) a means for transporting filler-containing mixture which includes at least one filter (page 11, lines 24-25 of the specification, elements labeled **16**, **48** and **79**); (b) a supply pipe coming from the CO<sub>2</sub> storage vessel which supply pipe opens into at least one pipe connecting the storage vessel for the isocyanate component or the polyol component to the main mixer (page 12, line 4, elements labeled **27**, **59** and **88**); (c) a mixing apparatus for mixing-in and dissolution of the CO<sub>2</sub> into the polyol or isocyanate component which is arranged between the CO<sub>2</sub> supply pipe where it opens into the isocyanate component or polyol component supply pipe and the main mixer (page 12, lines 1-4 of the specification; elements labeled **19**, **51** and **80**); and (d) a discharge body which generates a sudden change of pressure which discharge body includes at least one fine-meshed sieve that is arranged downstream of the main mixer (page 12, lines 14-17; elements labeled **25**, **57** and **86**).

#### **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

- A. Claims 17-35 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the present invention. The specific basis for this rejection was that the term "any filler" which appeared at line 10 rendered the claim confusing.

- B. Claims 17-35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Eiben et al (U.S. Patent 5,789,457) in view of Sulzbach et al (U.S. Patent 5,547,276), Davis et al (U.S. Patent 5,527,462) and WO 02/04190 (Sulzbach et al 04190).

## VII. ARGUMENTS

- A. Appellants' proposed amendment removes the basis for the indefiniteness rejection.

In Appellants' amendment filed in response to the Final Action, Claim 17 is amended at line 10 to replace "any filler" with "the filler" in accordance with the Examiner's suggestion.

It is believed that this amendment to Claim 17 would remove the basis for this rejection.

Entry of the requested amendment and withdrawal of this rejection is therefore requested.

- B. Appellants' invention is not rendered obvious by the combined teachings of Eiben et al, Sulzbach et al, Davis et al and WO 02/04190.

Eiben et al discloses a method and device for producing foams using carbon dioxide dissolved under pressure in which the reaction mixture is passed through at least one fine-meshed net. The fine-meshed net increases the shear and generates bubble nuclei to produce a foam having a homogeneous density.

Eiben et al does **not** teach or suggest a device in which less than all of the combined reaction components is passed through a filter before the reaction mixture is passed through the fine-meshed net disclosed therein. In contrast, Appellants' claimed device requires such a filter.

Eiben et al does **not** teach or suggest a device for producing foams from a reaction mixture which includes a filler.

The significance of this difference is discussed at page 2, lines 15-19 of the specification where it is noted that inclusion of a filler in the foam-forming mixture limits the size of the openings in a mesh net and presents problems with respect to production reliability.

Sulzbach et al discloses a method and apparatus for continuously dispersing fine particle-sized solids in a liquid. In the disclosed method and apparatus, fine particles are continuously dispersed in a liquid.

Sulzbach et al does not teach or suggest an apparatus in which the liquid into which the fine particle-sized solids has been dispersed is passed through a filter as is required in Appellants' claimed apparatus.

Davis et al discloses a self-cleaning filter apparatus.

Davis et al does not teach or suggest anything with respect to an apparatus for the continuous production of polyurethane foams. Therefore, even if one skilled in the art seeking to develop a continuous process for the production of polyurethane foams were to elect to use the Davis et al filter in that process, the teachings of Davis et al would provide no suggestion or guidance with respect to the point at which such filter should be located.

WO 02/04190 discloses a process for the production of foams from flowable reaction components which are loaded with a powder, fine-grained or fibrous loading material with a foaming agent that is transformed from a liquid to a gaseous state as it passes a discharging mechanism. The discharging mechanism is connected downstream of the main mixer. The discharging mechanism is prevented from becoming clogged by an agglomerate reducer which is situated between the loading material feed and the discharging mechanism.

The powder in a liquid reaction component, and not the powder alone, is passed through the agglomerate reducer employed in the apparatus of WO 02/04190.

In contrast, in the present invention, the agglomerate reducer is used to comminute the filler before that filler is combined with any of the liquid reaction components.

Appellants maintain that one of ordinary skill in the art reading the cited references at the time that Appellants made their invention would not be guided by the teachings of those references to Appellants' claimed invention.

More specifically, Eiben et al teaches that the foam-forming mixtures disclosed therein should be passed through the fine-meshed net after they have all been combined and mixed.

One skilled in the art combining the teachings of Sulzbach et al with the teachings of Eiben et al would therefore consider it "obvious" to disperse a filler in a liquid reaction component, combine that filler-containing liquid component with the other reaction components and mix those components before passing that reaction mixture through the fine-meshed net taught by Eiben et al.

Further combination with the self-cleaning filter apparatus of Davis et al would render "obvious" an apparatus in which a filler is dispersed in a liquid reaction component, and that filler-containing liquid component is combined and mixed with the other reaction components before passing that reaction mixture through a self-cleaning fine-meshed net filter of the type taught by Davis et al rather than the simple fine-meshed net taught by Eiben et al.

Further combination with the agglomerate reducer taught in WO 02/04190 would render "obvious" to one skilled in the art an apparatus in which a filler is dispersed in a liquid reaction component, treated with the agglomerate reducer taught in WO 02/04190 before that filler-containing liquid component is combined and mixed with the other reaction components to form the reaction mixture which is passed through a self-cleaning fine-meshed net filter of the type taught by Davis et al rather than the simple fine-meshed net taught by Eiben et al.

This "obvious" apparatus generated from the combined teachings of the cited references does not, however, correspond to or render obvious Appellants' claimed apparatus in which (1) the filler must be comminuted before being combined with a liquid reaction component and (2) the filler-containing liquid reaction component is passed through a filter before that filler-containing component is combined with the other reaction components.

The Examiner has maintained that filtering components for the purpose of separating materials from a component as determined by the filter mesh size is a modification within the skill of the ordinary practitioner.

Appellants would note, however, that the sieve positioned downstream of the main mixer in the claimed device produces bubble nuclei as is taught by Eiben et al. If solid filler is filtered off by means of this sieve, the ability of the sieve to generate nuclei would be expected to be impaired.

Eiben et al does not teach or suggest how to pass a foam-forming mixture containing a solid filler through the disclosed sieve without adversely affecting formation of the bubble nuclei.

The Examiner has also argued that Eiben et al teaches inclusion of additives in the disclosed compositions and that "additive:" includes filler. (At page 4, lines 10-12 of the Final Office Action)

Appellants would point out, however, that the only additives specifically mentioned by Eiben et al are foam stabilizers. Foam stabilizers are not, however, solid fillers.

The Examiner has further argued that Sulzbach addresses the deficiencies of Eiben et al pertaining to the specifics of introducing and treating fillers.

Appellants would note, however, that Sulzbach et al teaches introduction of fine-particle-sized solids into the polyol component mixing apparatus by means of a metering screw which is positioned between a vacuum tank with a controlled filler level and the polyol component mixing apparatus.

Sulzbach et al does not teach or suggest a means for transporting filler-containing mixture which includes the filter required in Appellants' claimed invention. Nor would one skilled in the art consider it obvious to include such a filter because Sulzbach et al teaches that the object of the invention disclosed therein was to avoid the problem of blocked microfilters encountered when using the screw design taught in European Patent 431,388. (at column 1, lines 35-49)

Sulzbach et al does not therefore teach or suggest the means for transporting filler-containing mixture which includes at least one filter that is required in Appellants' claimed invention.

Davis et al does not teach or suggest the means for transporting filler-containing mixture which includes the at least one filter required in Appellants' claimed invention.

WO 02/04190 discloses a process in which powder in a liquid reaction component, and not the powder alone, is passed through an agglomerate reducer.

WO 02/04190 does not, however, disclose a process in which filler-containing reaction mixture is passed through a sieve to generate bubble nuclei.



The Examiner has maintained that Appellants' claims do not differentiate their apparatus from the combined teachings of the references based on employment of an apparatus component defined by the claims which specifically filters the filler component before mixing with other ingredients. (at page 4, lines 18-21 of the Final Office Action)

Appellants maintain that no combination of the cited prior art would teach or suggest to one of ordinary skill in the art that reduction of agglomerates in any manner would make it possible to pass a filler-containing foam-forming reaction mixture through a sieve to generate bubble nuclei without clogging the sieve and thereby adversely affecting the foam produced.

Appellants' position is supported by the fact that not one of the cited references addresses the challenge of balancing fineness of the openings of the sieve for generating bubble nuclei with the need to select an opening size to accommodate the filler to consistently produce a defect-free foam, i.e., the problem addressed and solved by the apparatus of the present invention.

Appellants' claimed apparatus which does make it possible to pass a filler-containing foam-forming mixture through a sieve to generate bubble nuclei without clogging during operation and thereby produce good quality foam is not therefore rendered obvious by the combined teachings of Eiben et al, Sulzbach et al, Davis et al and WO 02/04190.

Appellants' invention as claimed in Claims 17-35 is not therefore rendered obvious by the combined teachings of Eiben et al, Sulzbach et al, Davis et al and WO 02/04190.

#### VIII. CONCLUSION

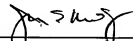
Not one of the Eiben et al, Sulzbach et al, Davis et al or WO 02/04190 teaches or suggests an apparatus capable of producing a filled polyurethane foam produced with carbon dioxide as the blowing agent without clogging of the sieve which generates bubble nuclei. Nor do these references include any teaching which would lead one skilled in the art to the solution for the clogging problem which has been solved by Appellants' claimed invention.

The teachings of Eiben et al, Sulzbach et al, Davis et al and WO 02/04190 can not therefore be combined in any manner which would render Appellants' claimed invention obvious.

Appellants therefore maintain that the Examiner's rejection under 35 U.S.C. §103(a) is in error and respectfully request that this rejection be reversed, that the requested amendment to Claim 17 be entered, and that Claims 17-35 be allowed.

Respectfully submitted,

By



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IX. CLAIMS APPENDIX

17. An apparatus for the continuous production of polyurethane foam comprising: (1) at least one storage vessel for each of the isocyanate component, polyol component, liquid carbon dioxide and any additive; (2) a feeding device for each of the isocyanate component, polyol component, any additive and liquid carbon dioxide; (3) a main mixer for mixing the isocyanate component and the polyol component; (4) a pipe between each of the storage vessels and the main mixer; (5) at least one container for receiving or storing filler; (6) an apparatus for the admixture of filler into the isocyanate component or the polyol component; and (7) an apparatus for comminution of agglomerates in the filler in which

- (a) means for transporting filler-containing mixture comprises at least one filter,
- (b) a supply pipe coming from the CO<sub>2</sub> storage vessel opens into at least one pipe connecting the storage vessel for the isocyanate component or the polyol component to the main mixer,
- (c) a mixing apparatus for mixing-in and dissolution of the CO<sub>2</sub> into the polyol or isocyanate component is arranged between the CO<sub>2</sub> supply pipe where it opens into the isocyanate component or polyol component supply pipe and the main mixer, and
- (d) a discharge body which generates a sudden change of pressure comprising at least one fine-meshed sieve is arranged downstream of the main mixer.

18. The apparatus of Claim 17 in which the apparatus for the comminution of agglomerates is based on rotor-stator principle.

19. The apparatus of Claim 17 in which the apparatus for the comminution of agglomerates comprises at least one nozzle or perforated orifice plate.

20. The apparatus of Claim 17 which further comprises a means for mechanically cleaning at least one filter.

21. The apparatus of Claim 17 which further comprises a continuous drive for mechanically cleaning at least one filter.
22. The apparatus of Claim 17 in which at least one filter comprises a two-dimensionally filtering filter element.
23. The apparatus of Claim 17 in which at least one filter having a two-dimensionally filtering filter element comprises an apparatus for mechanical cleaning.
24. The apparatus of Claim 17 in which at least one filter having a two-dimensionally filtering filter element and a means for mechanically cleaning comprising a continuous drive are present.
25. The apparatus of Claim 17 in which the means for transporting filler-containing mixture comprises at least two filters which are connected in series to form a filter cascade.
26. The apparatus of Claim 17 in which the discharge body comprises at least one sieve having openings that in at least one dimension are at least 1.2 to 10 times as large as openings in the finest filter.
27. The apparatus of Claim 17 in which the discharge body comprises at least one sieve having openings that in at least one dimension are at least 1.5 to 5 times as large as openings in the finest filter.
28. The apparatus of Claim 17 in which the discharge body comprises at least one sieve having openings that in at least one dimension are at least 1.8 to 4 times as large as openings in the finest filter.

29. The apparatus of Claim 17 in which the discharge body comprises at least one sieve having hole cross-sections in at least one dimension between 0.03 mm to 1 mm.

30. The apparatus of Claim 17 in which the discharge body comprises at least one sieve having hole cross-sections in at least one dimension between 0.07 and 0.7 mm.

31. The apparatus of Claim 17 in which the discharge body comprises at least one sieve having hole cross-sections in at least one dimension between 0.3 mm and 0.5 mm.

32. The apparatus of Claim 17 in which the discharge body comprises at least two sieves which are consecutive in the direction of flow and are arranged relative to one another so that no hole of the first sieve is aligned with a hole of the second sieve.

33. The apparatus of Claim 17 in which an adjustable choke element is positioned between the main mixer and the discharge body.

34. The apparatus of Claim 17 in which the means for admixture of the filler includes a premixer and a feed screw embodied as a compression screw.

35. The apparatus of Claim 17 in which the means for admixture of the filler comprises a vessel equipped with a stirrer.

X. EVIDENCE APPENDIX

None

XI. RELATED PROCEEDINGS APPENDIX

None